Phoenix Contact

Automation Training

Training Brochure

一） 概览/ Overview

自动化技术不断地发展，变得越来越复杂。定期的培训课程，有助于拓展和更新用户的知识面，使用户跟上技术发展步伐。

我们的培训计划包括标准培训课程和用户定制培训课程，以满足您的各种要求。最新的控制技术和经验丰富的培训工程师，以确保培训课程既实用又成功。从我们的标准培训课程中选择满足您要求的培训课程，形成最适合您的培训套餐。或者，您可以确定一个定制培训课程，这意味着您可以指定培训主题，日期，地点和时间。我们的专家将很乐意协助您，选择合适的课程。

Automation technology is developing continuously and therefore becoming increasingly complex. Regular training courses expand and deepen the user's knowledge, which helps to keep pace with technology development.

Our training program ranges from the usual standard training courses through to individual training courses tailored to meet your requirements. The latest technology and experienced instructors combine to ensure that the training courses are both practical and successful. Create a training package tailored to your requirements by choosing from our range of standard training courses. Alternatively, you can decide to have an individual training course, which means that you can specify the topic, date, location, and duration of the course. Our experts will be happy to assist you in choosing the right course for your needs.

二） 标准培训/Standard Training

标准培训课程覆盖菲尼克斯自动化的所有技术，内容包括总线技术、网络技术、无线技术、基于 IEC61131 的 PC WORX 编程、高级编程、SCADA 系统、安全技术等内容，热门课程如下：

Standard training courses cover the major Phoenix automation technology. The contents of standard training consist of fieldbus technology, network technology, wireless technology, PC WORX programming, advanced programming, SCADA system and functional safety, and so on. The hot courses are listed as follows.

1） PROFINET 技术系统课程/**PROFINET TECHNOLOGY SYSTEM COURSE**
2） 工业以太网系统课程/**INDUSTRIAL ETHERNET SYSTEM COURSE**
3） 以太网安全及远程维护/**ETHERNET SECURITY & REMOTE MAINTENANCE**
4） 工业无线系统课程/**INDUSTRIAL WIRELESS SYSTEM COURSE**
5） PCWORX IEC61131 基础编程课程/**PCWORX IEC61131 BASIC PROGRAMMING COURSE**
6） PCWORX IEC61131 高级编程课程/**PCWORX IEC61131 ADVANCED PROGRAMMING COURSE**
7） VISU+ 组态软件用户课程/**VISU+ CONFIGURATION SOFTWARE USER COURSE**
8） WEBVISIT 用户课程/**WEBVISIT USER COURSE**
9） 功能安全系统课程/**FUNCTIONAL SAFETY SYSTEM COURSE**
10） INTERBUS 安装与启动/**INTERBUS INSTALLATION & STARTUP**

三） 用户定制的培训/Tailored Training

当我们的标准培训课程不能满足您的需要时，我们可根据贵公司所安装使用的设备、您所需培训的员工及他们工作职责等情况，为您特别定制培训方案。详情请咨询菲尼克斯培训中心（025-52102908，ccax@phoenixcontact.com.cn）。

When the standard training courses can’t meet your needs, we can provide you customized individually training scheme according to installed devices of your company, your employees to be trained, their work responsibilities and other related information. For more information, you can contact Phoenix Contact training center (025-52102908, ccax@phoenixcontact.com.cn).

四） 培训需求分析/Training Requirements Analysis

当贵公司使用了多种菲尼克斯自动化产品，您发现自己的电气维护人员对菲尼克斯自动化产品和系统维护不力， 而又不知维护人员的技能和潜力如何，以及怎样来提高维护队伍的水平来完成日益复杂的维护保养任务时，请您选用：培训需求分析。

培训需求分析旨在帮助用户进行有关菲尼克斯自动化产品培训需求分析，设计并规划出针对性较强的培训教案，以满足不同用户的要求。

如您选择了培训需求分析，我们的培训工程师会对您进行专访，并对您将要受训人员调查以下内容：

- 工作职责
- 所需的或所欠缺的工作技能
- 员工针对自己工作需要，自我评估提出的培训要求

专访后，我们会收集整理专访资料，并提供培训需求报告。报告内容包括：推荐培训的课程、课程描述、课程流程图及培训后员工所应达到的业务技能等。

Please choose training requirements analysis, if your company applies a variety of Phoenix automation products, and you find your electrical maintenance staff can’t maintain Phoenix automation products and system adequately and have no idea about the skills and potentials of your staff and how to improve the competence of your maintenance group.

Training requirements analysis is aim to help user carry out the training requirements analysis of Phoenix automation product and to design and plan special training theme with strong points to satisfy different customer needs.

If you choose training requirements analysis, our training engineer will give you an exclusive interview and inquire into some information about your employee to be trained.

- Job responsibility
- Work skills which they require or lack
- Training requirements that they raise according to their work need through self-assessment

After the interview, we will collect and sort out the interview information and offer you training requirement report. The report involves suggested training courses, course descriptions, flowchart of courses and the resulting vocational skills your employees will achieve after the training.

1） PROFINET 技术系统课程

本课程将为您介绍 PROFINET 系统的安装、组态、启动及诊断。您将了解到 PROFINET 电缆和光缆的接线规范并有机会亲自动手制作并测试 PROFINET 电缆和光缆。在 Ethernet 的理论基础之上，您还能学习到 PROFINET 技术的理论知识，并了解 PROFINET 设备特性，学会如何设置 PROFINET 组件并配置 PROFINET 网络，以启动整个 PROFINET 系统。您还能了解到如何对 PROFINET 系统及网络进行诊断,并掌握在设备故障时如何进行 PROFINET 设备的自动替换。该课程还可以帮助用户配置一个多样化的 PROFINET 设备组成的工业以太网。

培训对象：

渴望学习了解 PROFINET 技术的系统集成商、软件工程师、调试工程师，终端用户的维护工程师和现场安装工程师，以及使用 PROFINET 作为自动化解决方案的规划工程师。

知识要求：

具备数据处理、数据传输以及自动化技术的基本知识，并熟悉工业以太网。

课程内容：

- 以太网基础知识
- PROFINET在自动化中的应用
- PROFINET基础知识
- PROFINET电缆和光缆接线指导
- PROFINET系统安装指导
- PROFINET系统启动
- PROFINET组件
- PROFINET系统软件组态
- PROFINET通信监控
- 自动设备替换
- PROFINET系统及网络诊断
- 理论考核
- 实践考核

PROFINET TECHNOLOGY SYSTEM COURSE

This training course gives you an introduction about installation, configuration, startup and diagnosis of PROFINET system. You will know about assembly standards of PROFINET cable and fiber optics and you will have the chance of assembling PROFINET cable and fiber optics on your own. On the basis of Ethernet theory, you will learn about PROFINET theory, characteristics of PROFINET components, and settings of PROFINET devices and configuration of PROFINET networks for the startup of the whole PROFINET system. Moreover, you will be able to diagnose PROFINET system and networks and know how to perform the device replacement when a device breaks down. The course also can help user configure an industrial Ethernet consisting of various PROFINET components.

Target Group:

System integrators, software engineers, commissioning engineers, maintenance engineers from terminal users, field installation engineers and planning engineers who apply PROFINET as automation solutions

Requirements:

Have basic knowledge of data processing, data transmission, automation technology and be acquainted with industrial Ethernet.

Program:

- Ethernet basis
- PROFINET in automation environments
- PROFINET basis
- Wiring guidance of PROFINET cable and fiber optics
- PROFINET system installation
- PROFINET startup
- PROFINET components
- Configuration in PCWORX
- Communication monitoring
- Automatic device replacement
- System diagnostics and network diagnostics
- Theory test
- Practical test

2) 工业以太网系统课程

本培训课程是介绍工业以太网如何应用于自动化技术中的。我们将向学员讲授以太网技术基础知识，并组织实践练习，采用光缆、电缆以及各类以太网组件搭建工业网络，通过该实践练习掌握以太网产品应用。

培训对象：

菲尼克斯网络系统集成商、网络工程师和调试工程师，终端用户的维护工程师、以及想学习菲尼克斯网络系统的相关人员。

知识要求：

具备数据处理、数据传输以及自动化技术的基本知识。

课程内容：

- 工业以太网技术的介绍
- 以太网技术
  -传输介质
  -访问方法

-MAC 地址
-快速/千兆以太网
• 互联网协议 (IP)
-IP 地址
-IP 子网
-地址解析协议(ARP)
• 传输控制协议(TCP)
-连接监控
• 以太网设备
-介质转换器
-交换机
-安全路由器/防火墙
-代理服务器/网关
•工业级以太网
-拓扑
-电缆（双绞线电缆，光缆）
-Factory Line 产品系列
• 练习

INDUSTRIAL ETHERNET SYSTEM COURSE

This training course teaches you about how industry Ethernet is used in automation technology. It will teach you the basis of Ethernet technology and guide you to finish a practical exercise. You will set up an industrial network with twisted-pair cable, optical cables and various Ethernet components. The users will master the application of Ethernet products after the practice.

Target Group:

Phoenix Contact network system integrators, network engineers, commissioning engineers, maintenance engineers of terminal user and related personnel who want to learn Phoenix Contact network system.

Requirements:

Basic knowledge of data processing, data transmission, and automation technology

Program:

- Introduction to industrial Ethernet technology
- Ethernet technology
  - Transmission media
  - Access method
  - MAC address
  - Fast/gigabit Ethernet

- Internet Protocol (IP)
  - IP address
  - IP subnet
  - Address Resolution Protocol (ASP)
- Transmission Control Protocol (TCP)
  - Connection monitoring
- Ethernet coupling devices
  - Media converter
  - Switch
  - Security Router/Firewall
  - Proxies and Gateway
- Internet services
- Industrial Ethernet
  - Topology
  - Cable (twisted pair, fiber optic)
  - Factory Line product family
  - Exercises

3) 以太网安全及远程维护

本培训将介绍要求严格的以太网安全和远程服务解决方案理论和实践知识。 介绍安全网关 FL mGuard RS 理论知识，还提供完整的实践练习。 该网关可用于工业网络中的多种应用场合，能够对安全和远程服务解决方案进行独立的规划和调试。

培训对象：

菲尼克斯网络系统集成商、网络工程师和调试工程师，终端用户的维护工程师、以及想学习菲尼克斯网络系统的相关人员。

知识要求：

具有以太网基础知识

课程内容：

- 工业网络中存在的危险
- 安全理念
  -终端设备保护
  -网络保护
  -依靠用户的网络访问
  -安全远程监控
  -未受保护网络中的加密通信
- 网络地址转换（NAT）
  - IP 伪装
  -端口发送
  -1:1 NAT

- 防火墙
  -基于 Mac 地址、IP 地址和端口号的滤波器
  -状态包检查
  -防拒绝服务攻击
  -针对不同用户的个性化防火墙控制
- 运行模式
  -潜行
  -路由器
  -通过 HTTPS 进行远程连接
  -恢复过程
  -支持工具
- 虚拟专用网络（VPN）
  -通过以太网网络进行安全通信
  -通过共享密匙（PSK）和 X.509v3 证书认证
- 不同安全理念实践练习

ETHERNET SECURITY & REMOTE MAINTENANCE

This training imparts the conception and implementation of demanding Ethernet security and remote service solutions. The theoretical information is supplemented with comprehensive practical exercises about security gateway FL mGuard RS. Using the gateway in various application scenarios in an industrial network makes it possible for the participant to plan and debug security and remote service solutions independently.

Target Groups:

Phoenix Contact network system integrators, network engineers, commissioning engineers, maintenance engineers of terminal user and related personnel who want to learn Phoenix Contact network system.

Requirements:

Have Ethernet basic knowledge.

Program:

- Dangers in industrial networks
- Security concepts
  -Protection of terminal devices
  -Protection of networks
  -User-dependent network access
  -Safe remote monitoring
  -Encrypted communication in unprotected networks
- Network Address Translation (NAT)

- IP Masquerading
- Port Forwarding
- 1:1 NAT

• Firewall

-Packet filter on the basis of Mac addresses, IP addresses and port numbers
-State packet inspection
-Protection against denial-of-service attacks
- Individual Firewall control for different users

• Operating modes

- Stealth
- Router
- Remote access via HTTPS
- Recovery procedure
- Support tools

• Virtual Private Network (VPN)

- Safe communication via Ethernet network
- Authentication via Pre-Shared-Key (PSK) and X.509v3 certificates

• Practical exercises for implementation of various security concepts

4) 工业无线系统课程

本课程为您介绍自动化技术中的 WLAN 技术和蓝牙技术的应用，您将会学习到 WLAN 技术和蓝牙技术的基础知识及相关术语。您将研究自动化领域中典型应用的解决方案，并将这些解决方案用于若干实际练习中。在练习时间里您还可以自己动手利用我们的设备建立一个无线网络来巩固学习内容。

培训对象：

菲尼克斯无线网络系统集成商、网络工程师和调试工程师，终端用户的维护工程师、以及想学习菲尼克斯无线局域网和蓝牙技术的相关人员。

知识要求：

具备数据处理、网络技术及自动化技术的基本知识。

课程内容：

• 无线通信基础知识

-工业环境中的频率分配
-信号传播及范围

• WLAN标准

-现有频带和数据速率
-传输标准（IEEE 801.11a/b/g/n）的区分和选择

• WLAN网络结构

-WLAN设备寻址
-连接的定义和建立
-动态网络（漫游）构建

- WLAN网络安全
- WLAN介质管理
- 协议概述
- 蓝牙标准
  -性能等级划分
  -现有数据传输速率
  -频率分配
  -和其它无线设备共同使用（如 WLAN）
- 蓝牙网络拓扑结构
  -蓝牙设备寻址
  -连接的定义和建立
  -协议概述
  -无线参数的优化
- 天线技术基础知识
  -无线信号传输范围计算
  -根据法规规范选择合适的天线和天线电缆
- 蓝牙网络安全
- 学习自动化领域组态实例，通过实践练习讨论并执行多种解决方案

INDUSTRIAL WIRELESS SYSTEM COURSE

This training course teaches you about the application of wireless networks (LANs) and Bluetooth technology in automation technology. You will learn the basis of WLAN & Bluetooth technology and the associated terminology. You will discuss solutions for typical applications from the automation field and apply these solutions in several practical exercises. In practice section you will use our network components to set up a wireless network for automation system to consolidate what you have learnt in this course.

Target Group:

Phoenix Contact network system integrators, network engineers, commissioning engineers, maintenance engineers of terminal user and related personnel who want to learn Phoenix Contact WLAN and Bluetooth technology.

Requirements:

Have basic knowledge of data processing, network technology, and automation technology.

Program:

- Wireless communication basis
  -Frequency assignment in industrial environments
  - Signal propagation and range
- WLAN standard
  -Existing frequency bands and data rates

-Differentiation and selection of transmission standards (IEEE 801.11a/b/g/n)

- Structuring of WLAN networks

-Addressing of WLAN devices

-Definition and establishment of connections

-Structuring of dynamic networks (Roaming)

- Safety of Wireless LAN networks
- Media administration in Wireless LAN
- Protocol overview
- Bluetooth standard

-Division into performance classes

-Existing data rates

-Frequency assignment

-Coexistence with other wireless applications(e.g. WLAN)

- Topology of Bluetooth networks

-Addressing of Bluetooth devices

-Definition and establishment of connections

-Overview of protocol

-Optimization of wireless parameters

- Antenna technology basis

-Calculation of range of wireless signal

-Selection of suitable antennae and antenna cables according to legal regulations

- Safety of Bluetooth networks
- Study of configuration examples from the automation field, discussion and implementation of various solutions through practical exercises

5) PCWORX IEC61131 基础编程课程

介绍如何使用 PCWORX 进行自动化系统的组态和编程。学员将学习现场总线拓扑结构、IEC61131 软件模型、IEC61131 编程语言、功能、功能块及库文件的使用，练习创建程序实例及编程技巧。

培训对象：

基于菲尼克斯自动化解决方案的系统集成商、软件工程师和调试工程师，终端用户的维护工程师、以及希望切换至 IEC 61131 编程系统的编程人员。

知识要求：

具备自动化技术的基础知识。

课程内容：

- 现场总线基础
- 自动化系统硬件结构
- 可编程序控制器的结构，特征和通讯设置
- 总线系统的组态
- 过程数据分配

- IEC 61131软件模型
- IEC 61131编程语言:功能块图（FBD)，指令表（IL)，梯形图（LD)，顺序功能图（SFC),结构文本（ST）
- 程序组织单元（POU)、功能（FU)、功能块（FBD）
- 自定义数据类型
- 创建库文件及库文件使用
- 工程管理
- 编程技巧
- 实验

PCWORX IEC61131 BASIC PROGRAMMING COURSE

The course provides an introduction to the configuration and programming of automation system with PC WORX. You will learn fieldbus topology structure, IEC61131 software model, IEC61131 programming languages, functions, function blocks and usage of libraries. You will practice in creating program instance and some programming techniques.

Target Group:

System integrators, software engineers and commissioning engineers, who use Phoenix Contact automation solutions, maintenance engineers of end user and programming personnel who want to switch to IEC 61131 programming system.

Requirements:

Have basic knowledge of automation technology.

Program:

- Fieldbus basis
- Automation system hardware structure
- Structure, features, and communication settings of PLC
- Configuration of bus system
- Assignment of process data
- IEC 61131 software model
- IEC 61131 programming languages Function Block Diagram (FBD), Instruction List (IL), Ladder Diagram (LD), Sequential Function Chart (SFC), Structured Text (ST)
- Program Organization Unit(POU),Function(FU) and Function Block(FB)
- User-defined data type
- Library creation and library usage
- Project management
- Programming techniques
- Practice

6) **PCWORX IEC61131 高级培训课程**

在本课程中，学员将学习 PCP 通信（即 INTERBUS 参数通道）基础、RS232\485 串行通

讯、以太网网络通信、PROFINET 通讯及诊断、数据库基础和 SQL 数据库操作等知识；课程期间学员需自己动手完成相关实验，锻炼学员的应用能力，更好地解决工程中遇到的各种的疑难问题。

培训对象：

基于菲尼克斯自动化解决方案的系统集成商、软件工程师和调试工程师，以及希望切换至 IEC61131 编程系统的编程人员。

知识要求：

具备自动化技术和数据库程序的基础知识并参加过 PCWORX IEC61131 编程课程的学习。

课程内容：

- 以太网通讯基础
- 以太网通讯功能块编程
- Modbus/TCP 基础知识
- Modbus/TCP 功能块编程
- SNTP 及 IP_TIME 功能块时间同步编程
- 串口通信基础知识
- 串口通信编程
- PCP 通讯基础及相关工具的使用
- PCP 通信功能块编程
- PROFINET 通讯
- PROFINET 诊断
- ILC 3XX PN + ILC 170 通讯介绍及编程
- 文件读写功能块介绍及编程
- 数据库基础知识
- 数据库设计及练习
- 菲尼克斯 PLC 读写 SQL 数据库功能块介绍
- 菲尼克斯 PLC 读写 SQL 数据库编程练习

PCWORX IEC61131 ADVANCED TRAINING COURSE

In this follow-up course, you will learn about the basis of PCP communication, i.e. INTERBUS parameter channel, RS232\485 serial communication, Ethernet communication, PROFINET communication and diagnosis, database basis and SQL database operation. During the training, the learners need to finish some exercises by themselves, so that it can enhance their application ability to solve various tricky problems in projects smoothly.

Target Group:

System integrators, software engineers and commissioning engineers, who use Phoenix Contact automation solutions and programming personnel who want to switch to IEC61131 programming system.

Requirements:

Have basic knowledge of automation technology and SQL database, and have participated in PCWORX IEC61131 Programming.

Program:

- Ethernet communication basis
- Programming with Ethernet communication function blocks
- Modbus/TCP communication basis
- Programming with Modbus/TCP communication function blocks
- How to realize time synchronization using the function block SNTP or IP_TIME
- Basis of serial communication
- Serial communication programming
- Basis of PCP communication and how to use PCP tool
- Programming with PCP communication function blocks
- PROFINET communication
- PROFINET diagnosis
- Introduction to the communication between ILC 3XX PN controller and ILC 170 ETH controller and related programming
- Introduction to file reading and writing function blocks and related programming
- Database basis
- Database design and exercises
- Introduction to reading/writing SQL database function blocks
- Programming with reading/writing SQL database function blocks

7) VISU+ 组态软件用户课程

通过本课程，您将全面了解Visu+的功能特点，并学习如何创建属于自己的Visu+工程，除此以外，本课程还将教您如何正确设置触摸屏，使得工程成功下载及运行。

培训对象：

基于菲尼克斯自动化解决方案的系统集成商、软件工程师和调试工程师，终端用户的维护工程师、以及希望学习菲尼克斯可视化系统的工程师。

知识要求：

有自动化技术的基本知识。

课程内容：

- 功能特点介绍
- 工程创建
- 软件开发环境介绍
- PLC 驱动定义
- 变量定义
- OPC 配置
- 用户界面开发

- 图元动态连接
- 报警管理
- 数据记录
- 配方制作
- 用户管理
- Web 访问
- 短信报警
- 触摸屏设置
- 工程下载及运行

VISU+ CONFIGURATION SOFTWARE USER COURSE

In this course, you will learn the full functionality of Visu+, and learn how to create your Visu+ project. In addition, you will learn how to configure the HMI device with correct procedures, so as to download and run the project successfully.

Target Groups:

System integrators, software engineers, commissioning engineers, maintenance engineers of end user who already use Phoenix Contact automation solutions and those who want to learn visualization system from Phoenix Contact.

Requirements:

Have basic knowledge of automation technology.

Program:

- Functionality introduction
- Project creation
- Introduction of the development environment
- Definition of PLC drivers
- Variable definition
- OPC configuration
- User interface development
- Object animation
- Alarm management
- Data log
- Recipes
- User management
- Web access
- SMS alarming
- HMI device configuration
- Project download and run

8) WEBVISIT 用户课程

作为可视化课程内容的补充，本课程将介绍如何通过 WebVisit 软件进行用户界面的开发，并下载至控制器中，使得通过浏览器能够正确访问这些画面。

培训对象：

需使用 WebVisit 创建基于网页的可视化界面的专业人员。

知识要求：

自动化常用知识。 最好掌握更多的专业知识，如 PC WORX。

课程内容：

- 功能特点介绍
- 用户界面开发与变量连接
- 工程下载与运行

WEBVISIT USER COURSE

As an extension of visualization training course, this topic will introduce you how to create user interface with WebVisit editor, and download it to the controller. As a result, you can access this interface with web browser.

Target Groups:

Specialists who want to create a web-based visualization with WebVisit.

Requirements:

Have general knowledge of automation technology. Additional professional knowledge, e.g. of PC WORX, is desirable, but not necessary.

Program:

- Functionality introduction of WebVisit
- User interface creation and variable connection
- Project download and run

9） 功能安全系统课程

本培训课程将介绍自动化技术中的安全技术应用。 您将学习安全技术基础知识，并熟悉相关术语。 您将研究自动化领域中典型的安全回路设计方案，并将这些解决方案用于若干实际练习中。

培训对象：

计划使用安全产品的自动化工程师、规划人员和维护工程师。

知识要求：

具备自动化技术和安全概念的基本知识。

课程内容：

- 安全技术的必要性和使用场合
- 安全回路的基本组成及要求
- 基于菲尼克斯 PLC 的 SafetyBridge 安全技术的常规配置和安全功能实现
- 基于菲尼克斯安全 PLC 的 Profisafe 安全技术的常规配置和安全功能实现
- 菲尼克斯可编程安全继电器使用介绍
- 基于西门子安全 PLC 的 Profisafe 安全技术的常规配置和安全功能实现
- 学习安全领域组态实例，通过实践练习讨论并执行多种解决方案

FUNCTIONAL SAFETY SYSTEM COURSE

This training course will introduce safety technology application in automation technology. You will learn basic knowledge of safety technology and related terminology. You will learn typical safety circuit design plans in automation field and apply these solutions into practical exercises.

Target Groups:

Automation engineers, planners and maintenance engineers, who plan to use safety products.

Requirements:

Have basic knowledge of automation technology and safety concept.

Program:

- Necessity and application occasion of safety technology
- Basic components and requirements of safety circuit
- Conventional configurations of SafetyBridge safety technology based on Phoenix Contact PLC and realization of safety functions
- Conventional configurations of Profisafe safety technology based on Phoenix Contact safety PLC and realization of safety functions
- Introduction to Phoenix Contact programmable safety relay usage
- Conventional configurations of Profisafe safety technology based on Siemens safety PLC and realization of safety functions
- Study of configuration examples from the safety field, discussion and implementation of various solutions through practical exercises

10）INTERBUS 安装与启动

学员将系统学习 S7 控制系统的 CMD 知识，学习如何将 INTERBUS 集成到 S7 控制系统中。另外，还将学习 INTERBUS 标准功能块知识，以及如何使用这些功能块在循环程序中执行 S7 过程和总线控制。学员可在循环程序中使用诊断接口进行总线和 I/O 错误的诊断，并对此做

出响应。学员还将学习控制板的扩展地址区，以及如何在控制器中创建自己的 INTERBUS 功能。

培训对象

使用 INTERBUS 在 SIMATIC®S7 控制系统上完成自动化任务的规划人员，编程人员和调试工程师。

要求

具有相关的 CMD 知识， 熟悉 STEP7 编程软件

培训计划

- INTERBUS 系统，组件，拓扑（简明概述）
  -系统术语，总线拓扑，INTERBUS功能
- 控制板的结构，特征和设置
  -控制板接口和操作元素
  -控制板设置/操作模式
  -可能的地址区
- INTERBUS的诊断选项
  -S7控制系统的诊断接口
- 使用CMD组态软件进行INTERBUS组态
  -编辑一个组态好的总线组态
  -控制板的基本设置（诊断和控制寄存器/地址区）
  -寻址选项（扩展区）
  -创建用户自定义功能
- INTERBUS与控制系统的连接
  -S7站的结构
  -硬件组态
  -S5适配器的设置
  -使用诊断和控制寄存器，创建用户自定义功能
  -菲尼克斯电气标准软件的功能和使用

INTERBUS INSTALLATION & STARTUP

You will build up your CMD knowledge specific for S7 control system and learn how to integrate INTERBUS into a S7 control system. And you will also learn about INTERBUS standard function blocks and how to implement the S7 process and bus control in the cyclic program using these function blocks. You can use diagnostic interface in the cyclic program to diagnose bus and I/O errors, and to respond to these events with the bus. You will also learn about the extended address areas of the controller and how to create your own INTERBUS functions in the controller.

Target Group:

Planner, programming personnel, and startup engineers who carry out automation tasks on a SIMATIC® S7 control system with INTERBUS

Requirements:

Have relevant knowledge of CMD and knowledge of STEP 7 programming software

Program:

- INTERBUS system, components, topology (brief overview)
- System terms, bus topology, INTERBUS functions
- Structure, features, and settings of the controller board
- Controller board interfaces and operating elements
- Controller board settings/operation modes
- Possible address areas
- INTERBUS diagnostic options
- Diagnostic interface to the S7 control system
- INTERBUS configuration with CMD configuration software
- Editing an existing bus configuration
- Basic settings of the controller board (diagnostic and control registers/address areas)
- Addressing options (extended areas)
- Creating user-defined functions
- INTERBUS connection to the control system
- Structure of a S7 station
- Hardware configuration
- S5 adapter settings
- Using the diagnostic and control registers to create user-defined functions
- Functions and usage of Phoenix Contact standard software